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REMARKS

Claims 1-16 are presently pending in this application. By this Amendment, Claims 1, 6-9 and 11-16 have been amended. Reconsideration is respectfully requested.

CORRECTION OF THE DRAWINGS

In the Office Action of July 24, 2002 (and reiterated in the Office Action of January 24, 2003) the Examiner objected to the drawings and has requested the Applicant to supply proposed corrections. Accordingly, submitted herewith are proposed corrections to Figures 17 and 20. With regard to Figure 17, the Examiner objected for the reason that reference number 52a does not appear to be included in the specification at page 47. Upon review, Applicants respectfully note that, in fact, reference numeral 52a does appear in the specification at line 13, although that reference numeral was not shown in bold print as were the other reference numerals on that page.

However, in reviewing Figure 17, it does, nevertheless, appear that Figure 17 needs to be corrected, because the lead lines for numbers 52a and 51a appear to be pointing to the same structure. As made clear in the specification, solder (52a) is used to mechanically and electrically couple the dielectric 40 with the metallized layer 51a. Thus, the lead line for reference numeral 51a has been corrected to indicate the metallized layer in conformity with the description contained in the specification.

With regard to Figure 20, the Examiner has noted that reference numeral 36 should instead read reference numeral 535. This has been corrected.

The Examiner's review and approval of these drawing corrections are courteously solicited at this time.

CLAIM 1

Claim 1 has been rejected over the Nishikawa reference. The Nishikawa reference describes a number of dielectric resonator configurations, but none of them employ the Applicants' resonator structure as exemplified by applicant's Figure 1, in which the dielectric substantially fills the entire interior space defined by the columnar shielding case. Claim 1 has been amended to more fully recite this distinction. In view of this Amendment, it is respectfully submitted that Applicants' Claim 1, and all claims dependent on Claim 1, now fully distinguish over the Nishikawa reference.

CLAIM 6

Claim 6 has also been rejected over Nishikawa. Specifically, the Examiner has identified Figure 32 of the Nishikawa reference as the basis of this rejection. Upon careful examination of the Figure 32 Nishikawa embodiment, it is apparent that the Nishikawa structure is considerably more complex and expensive than what Applicants have invented. More specifically, as the Applicants understand the Examiner's position, Nishikawa element 62 (termed the upper lid) is encased in a conductive film (shown as element 69 in Figure 23). A rubber component 151 is disposed between the upper lid and outer lid 82 to keep the upper lid in close contact with the dielectric 66.

Instead of the complex and comparatively expensive structure envisioned by Nishikawa, the Applicants employ a planar conductive foil sheet that is sandwiched between an elastic layer and the case body. Examples of such structure are shown in

Applicants' Figures 7-18. The Examiner will appreciate that Applicants' structure, employing a planar conductive foil sheet, can be manufactured quite inexpensively. This is an important advantage, particularly where resonators and filters need to be manufactured in mass production quantities.

In order to more fully distinguish the Applicants' invention in this additional regard, Claim 6 has been amended to more fully recite a planar conductive foil sheet sandwiched between the elastic layer and the case body. It is respectfully submitted that Claim 6, and all claims dependent on Claim 6, now fully distinguished over the art of record.

More fully with regard to dependent Claims 7-9, the Examiner had previously rejected these under 35 U.S.C. §112. Specifically, the Examiner questioned the language "first portion" and "second portion." Accordingly, in order to make these claims more clear with respect to the parent claim, the terms "first portion" and "second portion" have been replaced with "body" and "lid."

CLAIM 11

Claim 11 has also been rejected over Nishikawa. However, as explained above, Nishikawa does not use the Applicants' more economical construction employing a planar conductive foil sheet sandwiched between the elastic layer and a case body.

Therefore, in order to more fully distinguish the Applicants' invention, Claim 11 has been amended to recite the Applicants' elastic layer and planar conductive foil sheet elements. As now recited the dielectric has lower and upper ends that are respectively disposed in contact with an inner face of the case and the conductive foil

sheet. It is respectfully submitted that Claim 11 now fully distinguishes over the Nishikawa reference.

CLAIM 12

Claim 12 has been rejected under 35 U.S.C. §102(b) over Nishiyama. Specifically, the Examiner has directed the Applicants' attention to Nishiyama Figure 7. Nishiyama employs a metal-based printed circuit board 18 that includes a metal base plate 18m, an insulative layer 18i and a metal film layer 18f. The printed circuit board is held, spaced apart, from the conductor to by a damper material 25.

As already discussed in connection with other ones of Applicants' claims, the Applicants employ a planar conductive foil sheet that is sandwiched between the elastic layer and the case body. Clearly, Nishiyama does not employ such a structure. To the extent the metal film layer 18f of the Nishiyama printed circuit board is construed by the Examiner as a planar conductive foil sheet, this structure is not placed in contact with the dielectric as in Applicants' structure.

Accordingly, to more fully distinguish the Applicants' invention from the Nishiyama reference, Claim 12 has been amended to recite the Applicants' elastic layer, the planar conductive foil sheet, and the contact relationship between the conductive foil sheet and the dielectric. It is therefore submitted that Claim 12 is now allowable over the Nishiyama reference.

CLAIM 13

Claim 13 has been rejected over the Nishikawa reference. As already discussed, the Nishikawa reference does not teach or suggest the placement of a dielectric within a

radio frequency filter such that the top, bottom and at least one side surface of the dielectric are in direct contact with the shielding conductor surrounding the dielectric.

Accordingly, to more fully distinguish the Applicants' invention in this regard, Claim 13 has been amended to recite a dielectric having top and bottom surfaces and at least one side surface, and further amended to recite that the shielding conductor surrounding the dielectric is formed in direct contact with the top, bottom and side surface of the dielectric. It is submitted that Claim 13, as amended, now fully distinguishes over the art of record.

CLAIM 14

Claim 14 has also been rejected over the Nishikawa reference. As previously discussed, however, the Nishikawa reference does not use the Applicants' planar conductive foil sandwiched between the elastic layer and the case body. Moreover, the Nishikawa reference does not teach or suggest placing the dielectric having lower and upper ends that are respectively disposed in contact with an inner face of the case and the conductive foil sheet. Accordingly, to more fully distinguish the Applicants' invention from Nishikawa, Claim 15 has been amended to recite these features not found in Nishikawa. It is submitted that Claim 15 is also in a condition for allowance.

CLAIM 16

Claim 16 has been rejected under 35 U.S.C. §103 in view of Nishikawa and Liang. The Examiner has cited that Liang reference as teaching a resonator filter with tuning element. However, the combination of Nishikawa and Liang still fails to teach

Applicants' planar conductive foil sheet sandwiched between the elastic layer and the case body. Thus Claim 16 has been amended to more fully recite Applicants' planar conductive foil sheet. The advantages of Applicants' construction have been discussed above. Thus it is respectfully submitted that Claim 16 is now also in a condition for allowance.

CONCLUSION

By these amendments the Applicants have endeavored to address each of the matters raised by the Examiner in the current Office Action, as well as any residual matters from the previous Office Action that the Examiner has brought to Applicants' attention. It is respectfully submitted that all claims are now in a condition for allowance. Such allowance is therefore courteously solicited at this time.

Should the Examiner wish to discuss any matters related to this application, he is respectfully encouraged the undersigned at (248) 641-1600.

Respectfully submitted,

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ATTACHMENT FOR CLAIM AMENDMENTS

The following is a marked up version of each amended claim in which underlines indicates insertions and brackets indicate deletions.

1. (Twice Amended) A resonator comprising:

a columnar shielding case composed of a conductive material and defining an interior space; and

a dielectric substantially filling the entire interior space [filled in the shielding case], the resonator using a resonant mode causing generation of a current crossing a corner of the columnar shielding case.

6. (Twice Amended) A resonator using a TM mode, the resonator comprising:

a case composed of a case body and a lid;

a dielectric fixed therein;

an elastic layer sandwiched between the lid and the case body; and

a planar conductive foil sheet sandwiched between the elastic layer and the case body,

wherein lower and upper ends of the dielectric are respectively fixed to an inner face of a bottom of the case body and the conductive foil in contact therewith.

7. (Amended) The resonator of Claim 6, wherein [the case includes a first portion and a second portion,] the conductive foil sheet is interposed between the [first portion] case body and the [second portion] lid, and the dielectric is electromagnetically shielded by the [first portion] body and the conductive foil sheet.

8. (Amended) The resonator of Claim 6, wherein [the case includes a first portion and a second portion,] the conductive foil sheet is interposed between the [first portion] case body and the [second portion] lid, and the dielectric is sandwiched between the [first portion] body and the [second portion of the case] lid.

9. (Amended) The resonator of Claim 7, further comprising an elastic layer interposed between the conductive foil sheet and the [second portion] lid.

11. (Amended) A resonator comprising:
a dielectric having a hole;
a case surrounding the dielectric;
an elastic layer sandwiched between the lid and the case body;
a planar conductive foil sheet sandwiched between the elastic layer and the case body;

the dielectric having lower and upper ends that are respectively disposed in contact with an inner face of the case and the conductive foil sheet; and

a conductor rod inserted into the hole of the dielectric, the insertion depth of the conductor rod being variable,

wherein a resonant frequency is adjusted with the insertion depth of the conductor rod into the hole.

12. (Twice Amended) A radio frequency filter comprising:
a case body and a lid respectively composed of a conductive material;
an elastic layer sandwiched between the lid and the case body;
a planar conductive foil sheet sandwiched between the elastic layer and the case
body;

a dielectric fixed therein and in contact with said conductive foil sheet, wherein a coaxial connector is placed on an outer surface of the case body,

a center conductor of the coaxial connector extends through an inner portion of the case body,

one end of a conductor probe is connected to the center conductor, and
another end of the conductor probe is connected to the [lid] conductive foil sheet.

13. (Amended) A radio frequency filter having a columnar resonator using a resonant mode causing generation of a current crossing a corner, the resonator comprising:

a dielectric having top and bottom surfaces and at least one side surface; and
a shielding conductor surrounding the dielectric formed in direct contact with the [surface] top, bottom and side surface of the dielectric.

14. (Twice Amended) A radio frequency filter having a resonator using a TM mode, the resonator comprising:

a case composed of a case body and a lid;
a dielectric fixed therein;
a case for housing the dielectric;
an elastic layer sandwiched between the lid and the case body; and
a planar conductive foil sheet sandwiched between the elastic layer and the case body,

wherein lower and upper ends of the dielectric are respectively fixed to an inner face of a bottom of the case body and the conductive foil in contact therewith, and part of the case is constructed of conductive foil and the conductive foil partly shields the dielectric electromagnetically.

15. (Amended) A radio frequency filter having a resonator, the resonator comprising:

a dielectric having a hole;
a case surrounding the dielectric;
an elastic layer sandwiched between the lid and the case body;
a planar conductive foil sheet sandwiched between the elastic layer and the case body;
the dielectric having lower and upper ends that are respectively disposed in contact with an inner face of the case and the conductive foil sheet;
and

a conductor rod inserted into the hole of the dielectric, the insertion depth of the conductor rod being variable,

wherein a resonant frequency is adjusted with the insertion depth of the conductor rod into the hole.

16. (Twice Amended) A radio frequency filter having a plurality of resonators at least including an input-stage resonator having a dielectric and receiving a radio frequency signal from an external device and an output-stage resonator having a dielectric and outputting a radio frequency signal to an external device, the radio frequency filter comprising:

a case surrounding the plurality of resonators for electromagnetically shielding the respective resonators,

wherein each of the input-stage resonator and the output-stage resonator comprise:

- (a) a case body and a lid;
- (b) a dielectric fixed therein;
- (c) an elastic layer which is sandwiched between the lid and the case body;

and

(d) a planar conductive foil sheet which is sandwiched between the elastic layer and the case body,

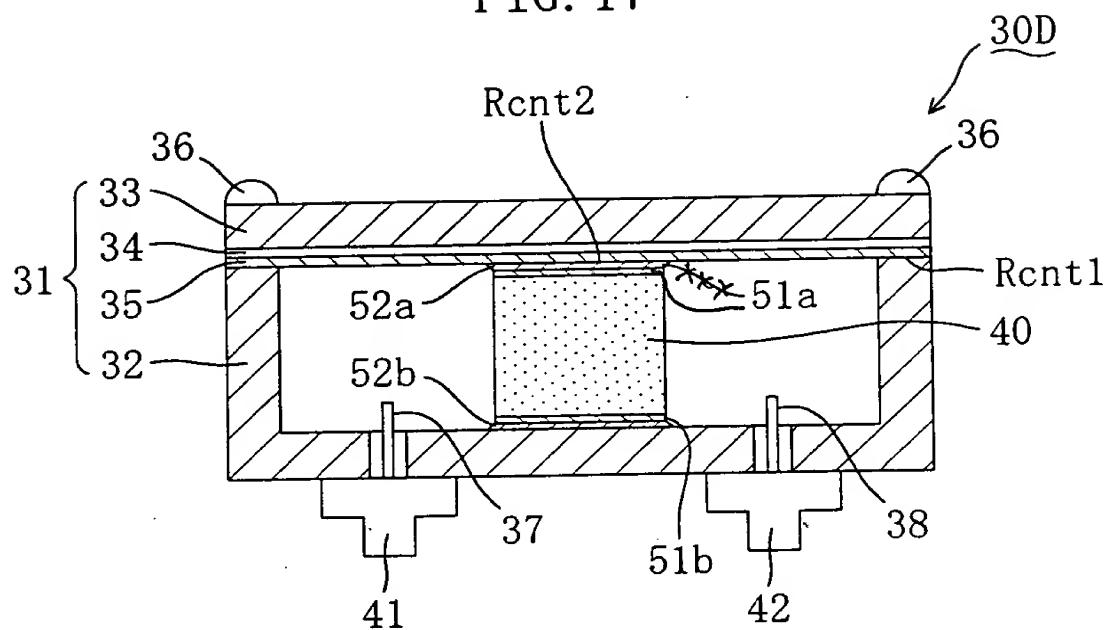
(e) wherein lower and upper ends of the dielectric are respectively fixed to an inner face of the bottom of the case body and the conductive foil in contact therewith,

a partition formed between resonators of which electromagnetic fields are coupled with each other among the plurality of resonators;

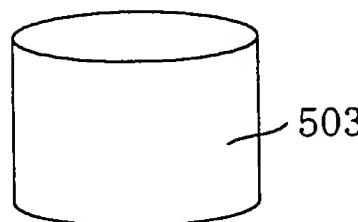
an input-stage coupling window formed at the partition; and

an input-stage coupling degree adjusting member made of a conductor rod for adjusting the area of the inter-stage coupling window.

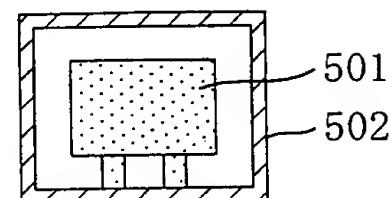
FIG. 17



PRIOR ART
FIG. 19A



PRIOR ART
FIG. 19B



PRIOR ART
FIG. 20

